

Michael Pierce

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- 1. The Arizona wine industry is still relatively young. Where do things stand in regards to finding the best sites, best grape varieties and most appropriate viticultural techniques? (If you could start with a sentence or two about when and how the modern history of the industry began, that would be great. We need to work in a little background for people who don't know anything about AZ wine.)**

The first post-prohibition commercial plantings of *Vitis vinifera* in Arizona were done with the help of a grant sponsored by the Four Corners Commission meant to study the viability of wine grapes as an economic stimulating crop in the Southwest. The grant was written by a University of Arizona soil scientist named Dr. Gordon Dutt in 1976. Dr. Dutt had previous experience with table and wine grape vineyards in the Tucson and Yuma areas. Based on lessons learned from those projects he looked for a site for this grant funded vineyard with good air drainage, a higher elevation and acidic soils. He chose the Sonoita area 60 miles southeast of Tucson which sits at an elevation of 5,000 feet. The soil in that region has a top layer referred to as Terra Rossa, which consists of a clay-rich acid soil with iron giving it a distinctive rusty color. Below this layer is a more basic limestone. The first cultivars were primarily chosen based on what was popular at the time - Cabernet Sauvignon, Chenin Blanc, Sauvignon Blanc. All of Dr. Dutt's original plantings succumbed to Pierce's disease in the early 1990s and had to be replaced. Today the majority of vineyards in Arizona are free of PD but the threat remains on the minds of growers. Establishing a vegetation-free zone around your vineyard and having IPM in place are the lessons that have been learned by any grower who has been hit. Sonoita is currently Arizona's only AVA. There are two other established growing regions in Arizona. Willcox in the southeastern part of the state and the Verde Valley an hour and half north of Phoenix. As of 2012 approximately three-quarters of the state's wine grapes come from the Willcox area. A petition is pending to establish Willcox as an AVA. Region specific wine characteristics are slowly starting to show themselves as farming practices become more uniform. Both vineyard yields and grape quality have surged in the last few years. Varietal selection in AZ has not been refined down to a certain few yet. There is a large list of varieties that will grow well here and a short list of bad varieties. Through trial and error over the years some of the varieties that have proven themselves in Arizona are things like Malvasia Bianca, Tempranillo, Grenache, Mourvedre, Graciano, Petit Verdot, Sangiovese and Tannat. Cultivars that thrive on full sunlight and the large temperature swings we see at the higher elevations where most vineyards are planted. These varieties have shown they want to be here by requiring a less invasive management approach from growers and creating wines with good concentration and balance. Varieties that are resistant to bunch rot and can hold up against the high humidity brought on by our late summer rains are certainly favored here. Kent Callaghan, one of the longest standing wine growers in the state, tried to make Zinfandel work for 15 years. Kent said, "That was mostly a disaster due to rot. I grafted/replanted that plot to Graciano in 2009 and the result is some of our best wine in the cellar since then." It's the sharing of experiences like these that has lessened the learning curve for new potential growers in the state. There are some other vineyard management experiments going on in the state where growers are trying to develop some best practices for our climate. For example, Merkin Vineyards is purposely setting a smaller structure on their new vines through water and nutrient management. The hope is that these smaller vines will naturally want to carry a smaller fruit load that will result in higher quality from the lower yield. The idea is to follow more of a European model of cropping. Also, perhaps this smaller crop can mature faster to avoid longer hang-times and higher pHs.

2. What are your biggest viticultural challenges in Arizona?

We have a couple of key viticultural challenges in the state though growers are learning to manage their inputs to better to mitigate the results of these threats. The two larger threats we face are late spring frosts and heavy monsoon rains around the time of ripening. When people think of Arizona they assume it's too hot and too dry to grow grapes. But the fact is that cold and wet weather at the wrong times are what we are faced with. The 2013 and 2014 vintages were both defined by the monsoon rains which hit us hard during the middle of our harvest period that runs mid-August to late September. If these afternoon rains come early enough in the season they can provide a welcomed break from the warm summer and an increase in phenolic maturity. However, it's proving to be a good practice to manage your vineyard with the expectation for potential heavy rains or hail later in the season. Growers are starting to get their canopies up and open and being careful not to set too much fruit. Regardless of the region you are in, picking a site with decent air-drainage is imperative to avoid winter kill and spring frost. Even a couple of feet can make the difference from a great site to an impossible one. Both the Willcox and Sonoita areas experience windy conditions throughout most of the summer. Hardy trellising and canopy management to avoid shoot damage is critical. The wind can likewise decrease moisture levels in the vines and increase the need for irrigation. This can be an issue during fruit set but also the high winds and warm growing season can shut down canopy growth. Making sure soil moisture levels stay up is important. We have to be careful how or if we deficit irrigate. We can't really follow the same irrigation model as California in that regard.

3. There are discussions in Arizona over water regulations that would affect the wine industry. Where does the water situation stand?

Arizona has some unique legislation regarding water. The state manages surface and ground water separately. Nearly all of the Arizona's vineyards survive off of ground water. The Willcox basin, which is home to the majority of wine grapes in the state, has a large agricultural industry that is sustained almost entirely by large agricultural wells. The basin has an estimated 60 million acre feet of water. However, through the monitoring of well depths by the Arizona Department of Water Resources over the last 10 years an average water table drop of 3-6 feet per year has been seen. Some domestic wells in the area have gone dry forcing the issue of addressing the over-draft to the basin. Existing state laws allow for either an INA (irrigation non-expansion area) or an AMA (active management area) to be put in place by the ADWR to control such overdrafts. There have been recent talks of putting in place either an INA or an AMA in the Willcox basin. Both of these scenarios, although different in their management approach, would greatly affect the potential for new vineyards and limit the expansion of existing vineyards in the Willcox region. They also do not address the larger problem of an agricultural industry built on low-value high-water use crops. The wine grape industry hopes to provide a model for a sustainable water use crop that provides significant economic return to the community. A working group of grape growers in conjunction with some of the large commodity crop farmers, ranchers and residents has been formed in recent weeks. This group is creating a new management proposal known as a GCA (groundwater conservation area) which it hopes to put in front of the state legislature starting the January 2016 session. The idea of the proposal is to help transition the area to low-water use agriculture and slow the depletion of the aquifer over time. The proposal will also provide an exemption to allow for irrigation expansion for low-water use crops such as wine grapes. This will give the wine grape industry freedom to continue the search for ideal growing sites off of the valley floor. Further debates are currently happening in the Verde Valley over wells and their proximities to surface water sources whose water rights are held privately. One thing is for sure the conversation on water rights and appropriate use is far from over in Arizona.

4. How does grape physiology and wine chemistry differ in Arizona, compared with other viticultural areas like California? What are winemakers and viticulturists doing to mitigate problems or deficiencies?

It's difficult to speak in broad terms about Arizona wine grapes with three distinct growing regions and a large selection of varieties planted state-wide. In general, Arizona does not have trouble producing adequate sugar levels in grapes. The acid to sugar balance is typically more of the challenge growing in AZ. Certain sites with high pH soils, which effects nutrient availability, coupled with a warm growing season and a high rate of vine respiration tend to produce higher pH grapes. Growers are trying to mitigate this with a healthy canopy to fruit ratio to provide ripeness without any unneeded hang time. To compound the issue we tend to see elevated potassium levels in our musts. This creates a twofold effect where the potassium binds with tartaric acid and also reduces the vine's respiration of malic acid leading to fruit with high TA and high pH. This can be a challenge to address in the winery. There are a couple techniques growers are using to try and manage the final potassium levels in the fruit. Either by applying micronized gypsum through drip irrigation to supply extra calcium that will displace some of the potassium in the vines. Or through foliar calcium applications for the same purpose. By supplying the vines with cations other than potassium (calcium, magnesium, etc.) from flowering through veraison, the hope is to reduce total potassium in the leaves and stems. While acidulation in the winery is fairly common in red wine some wineries are choosing to live with higher pHs in the 3.9 - 4.0 range. The higher elevations (generally 4000-5000 feet) provide large diurnal temperature swings which help with tannin development. This allows for good aging potential despite elevated pHs. Acid levels in grapes are definitely a factor in the discussion about which varieties do well here. With intense sunlight during the summer days sun exposure also needs to be managed accordingly. Delicate white varieties like Viognier need adequate shade to avoid sunburn. Some vineyards are opting to modify their VSP system using cross arms to open up the canopy. This increases canopy efficiency by providing some shade to the fruit zone yet reducing leaf shading and promoting photosynthesis. It also opens the canopy to more air flow. Another thought is that by creating open canopies with high photosynthetic efficiency we can limit potassium movement from the foliage to the fruit during ripening. In terms of flavor profile, the wines are tasting more like Arizona every year as vineyards mature. I tend to pick up bright fruits with notes of dried herbs and dessert flowers in many of the wines.

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5. There are three primary growing areas in Arizona: Willcox and Sonoita/Elgin in the southeast and Verde Valley in the north. Are there other areas that show promise?

There are some pioneers in other parts of the state that are trying to grow grapes. The areas where I know this is happening is the Williamson Valley north of Prescott and in Kingman on the far western edge of the state. Many of these vineyards are still in their infancy and I'm not sure of the results so far.

6. Winemakers and growers in well-established areas have easy access to equipment, supplies, lab services and other necessities. What's the situation in Arizona? (I liked the stuff you told me about how you couldn't even get a tank valve without ordering it and how people will email each other to try to get a truckload together)

There is little wine industry infrastructure to pull equipment from in the state. Nearly all equipment must come from out of state. California suppliers for the most part. There are also no established wine grape nurseries yet so all new plant material has to be ordered out of state. With the small size of many of the producers and costs associated with trucking it has been beneficial for wineries and vineyards to partner up on orders and reduce shipping costs. It is not only more expensive to bring in things like barrels on our own it is logistically more of a pain. If you ship your small order common carrier it will make its way through Phoenix and be passed off to different regional carriers before it makes its way to wine country a few days later. Filling a truck with orders from the local wineries and having direct delivery has been the better way to go. Today for example, a 53' truck full of glass arrived in the Verde valley from California to deliver glass to 3 wineries before heading to wineries in Willcox. Slowly the industry is making its way into Arizona. As Kent Callaghan has noted, "Things are much better now, it has become much easier thanks to all the new folks that are in the industry here." Lab samples are commonly sent to California for analysis. Higher education has helped bring instructional resources to the state in the last few years which didn't exist before. Yavapai College in the Verde Valley has 8 acres currently planted (total of 17 acres are planned by 2021) and a full-scale teaching winery with a 3,000 cases capacity. 1-year certificates in Viticulture or Enology and a 2-year A.A.S. degree in Viticulture & Enology are offered. YC is also partnering with the University of Arizona's College of Agriculture and Life Sciences to create a data repository. The purpose is to create a community resource for state specific information pertaining to grape growing and winemaking. The U of A has also hired a cooperative extension agent in the southern part of the state to provide educational assistance to growers. Plans are in place to hire a second cooperative extension agent to be stationed in the Verde Valley whose focus is to be in viticulture.